UNITED STATES SPECIAL OPERATIONS COMMAND
12.1 Small Business Innovation Research (SBIR)
Proposal Submission Instructions

Introduction: The United States Special Operations Command (USSOCOM) seeks small businesses with strong research and development capabilities to pursue and commercialize technologies needed by Special Operations Forces. The USSOCOM Program Executive Officers (PEOs) submitted the topics and most topics are expected to transition to an acquisition Program of Record or Concept of Operation.

Contact with USSOCOM: During the pre-release period of this solicitation, any technical inquiries must be submitted in writing through sbir@socom.mil. All requests must include the topic number in the subject line of the e-mail. During the solicitation open period, all questions must be submitted through the SBIR Interactive Topic Information System (SITIS) at www.dodsbir.net/SITIS. See Section 1.5, c. of the DoD 12.1 SBIR Program Solicitation instructions for additional information. During the source selection period, e-mail is the only method of communication that will be used by the Government Contracting Officer to notify the submitter/proposer if they have or have not been selected for an award.

For additional information about electronic proposal submission, including uploading your Technical Proposal, refer to the instructions in the solicitation and the on-line help area of the DoD SBIR/STTR Submission site, or call the DoD SBIR/STTR Help Desk at 1-866-SBIRHLP (1-866-724-7457).

Phase I and Phase II Proposal Submission: USSOCOM will only accept proposals for the topics included in this solicitation and selects and funds only those proposals considered to be superior.

Potential offerors shall submit all Phase I and Phase II proposals in accordance with the DoD Program Solicitation at www.dodsbir.net/solicitation. The proposal submission, exclusive of the Company Commercialization Report and the Cost Proposal shall not exceed 25 pages. Pages submitted in excess of the 25 limit will not be reviewed.

Offerors must complete the cost proposal using the Cost Proposal form posted on the USSOCOM section of the www.dodsbir.net/solicitation site.

Unless otherwise specified in the Phase I topic description, all firms shall include as part of the Phase I proposal transportation costs for two round trips to travel to Tampa, Florida for two separate meetings. The first travel requirement shall be the Phase I Kick-Off meeting and the second travel requirement shall be for the Phase I Out-Brief meeting. The Principal Investigator and all other representatives needed to discuss the firm's technology pursuit shall attend the Phase I Kick-Off and Out-Brief meetings. The location of the Phase II Kick-Off and Out-Brief meetings will be specified in the Phase II Statement of Objectives.

All proposal information must be received electronically via the DOD SBIR/STTR Submission site. To submit, proceed to http://www.dodsbir.net/submission. Once registered, a firm must prepare (and update) their Company Commercialization Report Data, prepare (and edit) Proposal Cover Sheets, complete the Cost Proposal form, and upload corresponding Technical Proposal(s).

Paper copies will be deemed non-responsive and will not be considered. A complete electronic submission is required for proposal evaluation. An electronic signature is not required on the proposal. The DoD SBIR/STTR Submission site will present a confirmation page when a Technical Proposal file upload has been received. The upload will be available for viewing on the site within an hour. It is in your best interest to review the upload to ensure the server received the complete, readable file.

Site Visits: Site visits will not be permitted during the pre-release and open stages of the solicitation.

Security: All of the topics in the solicitation are UNCLASSIFIED, and only UNCLASSIFIED proposals will be accepted.

Phase I Awards: USSOCOM's SBIR Program is small compared to the other participating DoD agencies and on average awards three Phase I contracts per topic. The maximum amount of SBIR funding for a Phase I award is $150,000 and the period of performance is six months. USSOCOM does not include options in the resulting Phase I SBIR contracts. Phase I SBIR contracts are Firm Fixed Price contracts.

Evaluation: USSOCOM conducts a formal source selection process to determine which firms should be awarded Phase I SBIR contracts. USSOCOM evaluates Phase I proposals using the evaluation criteria specified in Section 4.2 of the SBIR Program Solicitation.

Phase II Awards: USSOCOM generally awards one follow-on Phase II contract should the feasibility study favorably conclude that further development will result in a technology that is suitable for its intended use. No Phase II SBIR contract will be awarded if the feasibility study concludes otherwise. A Phase II proposal is awarded with a period of performance of less than 24 months and at a typical price of $1,000,000. USSOCOM may elect to increase or decrease the Phase II award amount when it is deemed to be in its best interests. Proposals should be based on realistic cost and time estimates and not on the maximum time (months) and dollars. In preparing the proposal, firms should consider that workload and operational tempo will preclude extensive access to Government and military personnel beyond established periodic reviews.

USSOCOM invites Phase I firms to Phase II if effort conducted during Phase I delivers an innovative and feasible technology that is suitable for its intended use and that has the best chance to commercialize the technology. The Federal Acquisition Regulation mandate to compete federal procurements is satisfied during the Phase I source selection process.

For a follow-on Phase II effort, no separate solicitation will be issued. Only those firms that were awarded Phase I contracts, and have successfully executed their Phase I efforts, will be invited to submit a Phase II proposal. Invitations to submit Phase II proposals will be released at the end of the Phase I period of performance. Due to limited funding, USSOCOM reserves the right to limit awards under any topic.

USSOCOM invites Phase I firms to submit Phase II proposals and conducts the ensuing Phase II evaluations using the evaluation criteria specified in Section 4.3 of the SBIR Program Solicitation.

Phase III Awards: The Small Business Innovation Research Program Policy Directive, hereafter referred to as the Directive, and subsequent Public Laws provide for protection of SBIR data rights under SBIR Phase III awards. Per the Directive, a Phase III SBIR award is any work that derives from, extends or logically concludes effort(s) performed under prior SBIR funding agreements, but is funded by sources other than the SBIR Program. Thus, any contract or grant where the technology is the same as, derived from, or evolved from a Phase I or a Phase II SBIR/STTR contract and awarded to the company which was awarded the Phase I/II SBIR is a Phase III SBIR contract. This covers any contract/grant issued as a follow-on Phase III SBIR award or any contract/grant award issued as a result of a competitive process where the awardee was an SBIR firm that developed the technology as a result of a Phase I or Phase II SBIR. USSOCOM will give SBIR Phase III status to any award that falls within the above-mentioned description, which includes according SBIR Data Rights to any noncommercial technical data and/or

noncommercial computer software delivered in Phase III that was developed under USSOCOM SBIR Phase I or II funding documents.

Use of Non-Government Personnel: All proprietary material should be clearly marked and will be held in strict confidence. Restrictive notices notwithstanding, proposals may be handled for administrative purposes by a support contractor that is bound by appropriate non-disclosure requirements. Input on technical aspects of the proposals may be solicited by USSOCOM from non-Government consultants and advisors who are bound by appropriate non-disclosure requirements. Non-Government personnel will not establish final assessments of risk, rate, or rank offerors' proposals. These advisors are expressly prohibited from competing for USSOCOM SBIR awards. All administrative support contractors, consultants and advisors having access to any proprietary data will certify that they will not disclose any information pertaining to this solicitation, including any submission, the identity of any submitters, or any other information relative to this solicitation, and shall certify that they have no financial interest in any submission evaluated. Submissions and information received in response to this solicitation constitutes the offeror's permission to disclose that information to administrative support contractors and non-government consultants and advisors.

U.S. Citizen Status: As part of the Phase I proposal, the offeror shall verify the US citizen status of each employee that will participate in the technology effort.

Foreign Nationals: The definition of a foreign national is included in Section 2.3 of the DoD SBIR Program Solicitation. Consistent with Section 3.5.b (8) of the DoD Program Solicitation , the offeror shall identify all foreign nationals expected to be involved on the USSOCOM Phase I or Phase II effort to include the foreign national's country of origin and their level of involvement (identify specific tasks) each would accomplish. The offeror shall identify all foreign nationals in the appropriate section of the proposal. The USSOCOM SBIR Program oftentimes pursues technologies that require firms to complete the Department of Defense Contract Security Classification Specification (DD Form 254) to protect sensitive Government Furnished Property and Government Furnished Information during the Phase II period of performance. Offerors must ensure that individuals dedicated to participate in these USSOCOM technology pursuits have or are not barred from obtaining a personnel security clearance. USSOCOM may not award a Phase I SBIR contract to a firm whose personnel cannot obtain a security clearance.

International Traffic in Arms Regulation (ITAR): The identification of foreign national involvement in a USSOCOM SBIR topic is also needed to determine if a firm is ineligible for award on a USSOCOM ITAR designated topic. A firm employing a foreign national(s) on a USSOCOM ITAR topic must possess an export license to receive a SBIR Phase I or Phase II contract.

Inquiries concerning the USSOCOM SBIR Program should be addressed to sbir@socom.mil.

SOCOM SBIR 12.1 Topic Index

SOCOM SBIR 12.1 Topic Descriptions

SOCOM12-001 TITLE: Ka-band Spread Spectrum

TECHNOLOGY AREAS: Information Systems, Sensors, Space Platforms

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop a low visibility, small form factor Ka-band spread spectrum modem/antenna for Satellite Communications (SATCOM) backhaul of airborne Intelligence, Surveillance & Reconnaissance (ISR) sensor data as well as Communications on the Move (COTM) relay for ground-based Special Operations Forces (SOF) globally.

DESCRIPTION: SOF and conventional forces abroad rely heavily upon commercial Ku-band satellite architectures for tactical communications relay as well as backhaul of sensor data from ISR assets. As Ku-band satellite architectures are built based on business case analysis/demand, they are not available in all areas where SOF must operate or the costs given the associated competition for airtime at the rates/density we require is prohibitive. The technical attributes of spread spectrum technology further exacerbate the issue. Spread spectrum technology distributes data across a broader frequency range to reduce interference for other data streams/transmissions. This "spreading" also increases the amount of transponder space required to guarantee a specific signal strength (e.g., >4 Mhz to close 1 Mbps) resulting in higher costs. With the launch of the first 3 Wideband Global SATCOM (WGS) satellites and a projected launch of 3 additional, SOF and conventional forces have a unique opportunity to reduce their reliance upon Ku-band satellite architectures and migrate (where possible) their tactical communications relay as well as sensor data backhaul to the DoD-owned (read "free") WGS constellation. In order to do so, SOF requires commercial sector development of a WGS-certified, low visibility, small form factor commercial and military capable Ka-band spread spectrum modem/antenna. At the end state, it is expected this solution will leverage open standards in accordance with DoD/Joint architectures and eliminate the need for a proprietary ingest hub.

The material solution would be similar in size/configuration than existing Ku-band spread spectrum modems/antennas and provide maximum flexibility based upon the medium (e.g., airborne, ground and/or maritime) and satellite architecture (e.g., commercial Ku, commercial Ka and/or DoD Ka) available to SOF to execute assigned missions.

PHASE I: Conduct a feasibility study for the development and integration of a WGS-certified, low visibility, small form factor commercial and military capable Ka-band spread spectrum modem/antenna; to include the software requirements for the modem.

PHASE II: The objective of this phase will be to build a WGS-certified, low visibility, small form factor commercial and military capable Ka-band spread spectrum modem/antenna and software for the modem to support Ka Spread Spectrum.

PHASE III: DUAL USE APPLICATIONS: Applications for commercial use include First Responders. Other government agencies could also use this application in support of world-wide operations. Operations could cover urban, remote, airborne and maritime environments.

KEYWORDS: Satellite Communications (SATCOM), Intelligence, Surveillance & Reconnaissance (ISR), Communications on the Move (COTM), Ka-band spread spectrum, antenna, modem, and Worldwide Global SATCOM (WGS)

SOCOM12-002 TITLE: Innovative NIR/SWIR Sensor Development

TECHNOLOGY AREAS: Sensors

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop a compact, lightweight, low power, low cost near infrared/shortwave infrared (NIR/SWIR) sensor.

DESCRIPTION: USSOCOM has consistently leveraged the work performed by DARPA in SWIR imager technology. USSOCOM SORDAC-ST partnered with DARPA in the mid 1990's to develop SWIR cameras that operated at room temperature. Since that time DARPA has continued the development of SWIR technology in the areas of high resolution, low noise, and low power. Further advancements in the sensor area are required for a small, high performance sensor that can be implemented in various soldier systems to include the next generation of night vision goggles (NVG), weapon sights, and handheld or airborne systems. Today several requirements such as the USSOCOM Binocular/Monocular VAS CDD document the need for an "out of band capability" in future systems. More specifically, while the NVG roadmap shows the objective of a SWIR insertion into the digital NVG by FY14, Operators have recently identified a capability gap in today's theaters regarding "out of band" systems; today's enemies have the capability of operating in what used to be US force's night vision spectrum.

STATE OF THE ART ASSESSMENT: While current SWIR cameras have leveraged much of the DARPA development efforts, they do not meet the performance, size or weight for any of the soldier system applications for USSOCOM. Current commercial SWIR cameras have 640 x 512 resolution. Specific applications USSOCOM include a digital goggle application and various weapon sight applications. For both of these applications, the current cameras are too power hungry, too large in volume, too heavy, and insufficient resolution. Additional performance parameters that need improvement for USSOCOM applications include a lower noise floor, improved dynamic range, higher frame rates, and affordability.

The effort would target the proposed performance parameters below:
Resolution: >or = 1MP (threshold) >or = 4MP (objective)
Pixel Pitch: < or = 15 micron (threshold) < or = 10 micron (objective)
Spectral Response: 0.8 to 1.3 micron (threshold) 0.7 to 2.8 micron (objective)
Weight (Packaged FPA [includes ROIC]/camera core): < or = 85g/120g < or = 72g/107g
Volume (Packaged FPA [includes ROIC]/camera core): < or = 1.0 cubic inches/4.0cubic inches(threshold) < or = 1.0 cubi inches/3.0cubic inches (objective)
Power (camera core) @20C: < or = 4.5W (threshold) < or = 3.0W (objective)
Power (camera core) @40C: < or = 6.0W (threshold) < or = 5.0W @ 40 C (objective)
Noise Floor @20C: < or = 50e (threshold) < or = 25e (objective)
Frame Rate: 30Hz/60Hz switchable (threshold) Variable frame rate (30Hz-90Hz)
Readout Mode: Snapshot (threshold) Rolling and Snapshot (objective)
Lag: < or = 1 frame (threshold)
Intra-scene Dynamic Range: > or = 12 bits (threshold) > or = 16 bits (objective)
Operating Temperature: -40C to 60C (threshold) -40C to 60C (objective)
Digital Output Format (Camera Core): Camera Link (threshold)
Analog Output Format: RS170 (threshold)

PHASE I: The objective of this Phase will be to verify feasibility of producing a small, lightweight, low cost, high resolution sensor that will be producible at a TRL 7 or higher in the next two years.

PHASE II: The objective of Phase II will be to develop lightweight, low cost, high performance NIR/SWIR sensor prototype to demonstrate high performance within a small package. This will include meeting current requirements necessary for integration into the future digital night vision goggles. In addition, a path forward to production must be addressed in this phase along with the reduction of future sensor costs in production.

PHASE III: NIR/SWIR technology is used commercially to detect fiber optic breaks and other high speed data transmission lines. This technology development would transition directly to the commercial market, increase competition, and lower overall costs.

KEYWORDS: near infrared (NIR), shortwave infrared (SWIR), Indium Gallium Arsenide (InGaAs), Sensor, Camera

SOCOM12-003 TITLE: Dual Speed Read Out Integrated Circuit (ROIC)

TECHNOLOGY AREAS: Sensors

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Design, develop, and demonstrate innovative Dual Speed ROIC structures supporting a variety of infrared detectors across the broad frequency spectrum.

DESCRIPTION: The two main components of all infrared (IR) sensor system are the sensor (the focal plane array) that detects and converts the incoming radiation into an electrical signal in order to form an image and the ROIC. The detector array is the optically-sensing part of the sensor and can be made from a wide variety of materials that are sensitive in the wavelength band of interest. The ROIC is the signal processing component and is generally fabricated on a silicon substrate using volume commercial production integrated circuit processes. Once each component is fabricated and functionality is verified, they are mated physically and electrically through a hybridization process to form an FPA. Overall ROIC performance has a significant impact on the ultimate performance of the FPA and associated sensor system. There are several drawbacks with using standard 30 Hz. Smearing occurs when moving a sensors rapidly while scanning an area.

An innovative dual speed ROIC architecture, mated to a detector array within the band of interest and with suitable speed of response needs to be developed. This effort will establish a Dual Speed ROIC concept capable of performing conventional staring imaging at video frame rates, while simultaneously being able to process and detect each frame at 60 Hz. The ability to smartly integrate higher frame rates will provide an overall enhanced image quality and provide an automatic integration time providing the user enhanced image quality. The power consumption will also be extended because the sensor will not be continuously operating at 60 Hz all of the time.

In addition to the greatly increased frame rate, desired features include specialized functionality that will allow for windowing/binning, zoom, autonomous signal processing, programmable frame time, programmable conversion gain, and analog to digital conversion per pixel. In particular, the per-pixel selection of conversion gains adds tremendous flexibility in dealing with the wavelength-dependent scene irradiance. Similarly, on-chip A/D conversion greatly improves the noise performance of the array. These new Dual Speed ROICs would greatly enhance the capability of current imaging systems while adding increased flexibility for operation across a variety of illumination conditions.

STATE OF THE ART ASSESSMENT: Dual speed ROIC's are just starting to emerge. There are various hybrid approaches for maximum dwell time integration using Capacitive Transimpedence Amplifiers (CTIA) where constant switching occurs. There are ROIC's that move frames from one detector to another at a high frame rate, however, the power consumption is too high. Additionally, there are column parallel processes that are designed to support high frame processing. Dual speed ROIC's are required to capitalize on the need to temporary over-sample the image for maximum pixel interpretation.

This effort is looking to achieve better technical performance objectives in areas of frame rate (>60Hz), readout mode (rolling), noise floor (<25e @ 20C), power comsumption (<50mW), operating temperatures (-40C to 60C) and gains (50 to 1) with an ROIC output (Cameralink) while integrating up to 3 detectors.

PHASE I: Conduct a study of Dual Speed ROIC designs to determine the applicability, characterization, and feasibility of an integrated Dual Speed ROIC. Using this information, develop appropriate design paths to Dual Speed ROIC prototypes for use in Phase II.

PHASE II: Using the design developed in Phase I (with optimization), fabricate and demonstrate a moderate-scale Dual Speed ROIC supporting detectors across the spectrum. This Dual Speed ROIC will then be hybridized to a detector array to form a functioning focal plane array.

PHASE III: DUAL USE COMMERCIALIZATION: Military Application: Optimized Dual Speed ROIC's operating at varying frame rates with low noise have wide applications in a number of surveillance applications and could lead to significant improvements in force protection. Commercial Application: A variety of commercial applications are possible for enhanced ROIC's and enhanced FPA's with the ability to sense high speed, energetic events. Included are applications in homeland security and law enforcement.

KEYWORDS: Dual Speed ROIC, Sensor, Handheld, Survivability Equipment, Threat Detection: Missile, Hostile Fire, Laser

SOCOM12-004 TITLE: Facial Signature Reduction

TECHNOLOGY AREAS: Materials/Processes, Human Systems

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Reduce facial signature to enhance the warfighter's survivability on the battlefield by reducing his vulnerability of detection by Infrared/Electro-Optical (IR/EO) sensors operating from .4 microns to 14 microns.

DESCRIPTION: The Department of Defense (DoD) has an enduring need to reduce the personal signature of the warfighter on the battlefield. Suppressing the warfighter's personal signature to avoid detection is critical to mission success. The focus of this effort is the maritime environment which is broken down into four zones: (1) open ocean, (2) surf, (3) surf break (wash), and (4) beach. The environmental conditions listed below are not all inclusive but are prevalent and should be given careful consideration when developing solutions to enhance the warfighter's ability to suppress his signature.

- All (4) Seasons
- All Sea States
- Temperatures (Atmospherics and Water):
  - Cold Climates (less than 45 degrees Fahrenheit)
  - Temperate Climates (46-85 degrees Fahrenheit)
  - Hot Climates (greater than 86 degrees Fahrenheit)

- Lighting conditions:
  - Nighttime (All) – natural to include a full lunar cycle and manmade of various sources such as city glow

- Sky Conditions:
  - Clear and cloudy/overcast

Proposed signature reduction measures must not degrade current state of the art countermeasures for visual and near-infrared (NIR) protection that have been incorporated into combat uniforms, load carriage systems (pouches, rucksacks, etc.) weapons and helmets.

Proposed signature reduction measures should not restrict an operator's ability to swim with equipment and minimally affect his ability to breath, see and hear.

Signature reduction improvement will be evaluated by a Probability of Detection performance metric as well as Delta T and other contrast metrics, both static and with motion.

PHASE I: The objective of Phase I is to identify novel materials, products, and technologies that exhibit signature reduction capabilities for face and head region of the body. Preliminary design efforts should explore the applicability of a wide variety of technical approaches that have the potential to enhance the warfighter's ability to suppress his signature. Technological advancements may address one area of concern or offer a complete solution across all environmental conditions.

PHASE II: The objective of Phase II is to develop a facial signature reducing prototype solution. Features to be assessed will include:

• Signature reduction capability:
- When viewed by IR/EO sensors operating from .4 microns to 14 microns.

• Design:
- Form / Fit / Function
- Must not restrict swimming and breathing
- Must not limit situational awareness

PHASE III: This technology development will transition directly for use by military personnel and will complement existing signature management materials employed in both the land and maritime environment.

KEYWORDS: signature management, camouflage, sensor signature reduction

SOCOM12-005 TITLE: Alternate Ndi Technologies To Inspect New Spear Gen 3 Body Armor Plates

TECHNOLOGY AREAS: Materials/Processes, Sensors

ACQUISITION PROGRAM: Special Operations Forces Personal Equipment Advanced Requirements (SPEAR)

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTVE: Identify an alternate technology to ensure the integrity of ballistic plates.

DESCRIPTION: Non Destructive Inspection (NDI) is conducted on SPEAR body armor before initial delivery of a Lot and after each deployment. Currently, Special Operations Forces (SOF) and the other Services use 2-Dimensional (2D) Radiographic X-Ray to conduct the NDI. The 2D X-Ray provides limited data on the integrity of the plate and cannot penetrate the steel crack arrestor that is used in the current SPEAR GEN 3 system. Additionally, the NDI process does not allow the technician to reliably discern voids in the ceramic tile depending on the type of ceramic mixture that is used in the makeup of the plate.

PHASE I: Determine the feasibility of one or more new NDI techniques for use in ensuring the integrity of body armor plates. Provide quantifiable analysis and data to assess each NDI technique. The investigator must ensure that the data is relevant to the materials used by the SPEAR body armor developer and rank possible solutions based on the analysis and data found during discovery. Ranking should consider: cost, performance, availability, portability, and training requirements.

PHASE II: Investigators will use Commercial-Off-The-Shelf (COTS) sensors modified as required to provide a reliable, repeatable assessment of ballistic plates. The Phase II effort would be capable of mapping a select group of defective SPEAR GEN 3 plates using each of the technologies identified in Phase I. When these assessments are complete, defects within plates will be confirmed through deconstruction. A final report will consider: cost, performance, availability, portability, and training requirements.

PHASE III: There would be immediate applications for the U.S. Army for inspection of their Interceptor Body Armor Systems. Quality assurance in a variety of different industries would be able to apply the technology. The integrity of solid or composite structural members is particularly important in the aviation industry.

KEYWORDS: Body Armor, Non-destructive inspection, Ballistic materials, Ceramics, Ultrasound, CT Scan, 3-D Imaging

SOCOM12-006 TITLE: EZTV Video Display

TECHNOLOGY AREAS: Information Systems, Electronics

ACQUISITION PROGRAM: Mobile Phone Initiative

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop and demonstrate a mobile application (app) targeting Android mobile platforms that can provide an intuitive user interface for video on demand (VOD) streaming, video and audio playback, editing, and search capabilities. Mobile application shall be designed to interface with existing SOF infrastructure to include transport networks, storage, and media codecs and servers. The app shall be designed to support tactical situational awareness, command communications, video monitoring, training/education, and TV over IP.

DESCRIPTION: Current state of the art of Android mobile platforms provides various media codecs, containers, and network protocols to support development of multimedia applications. Media players currently developed for the Android platforms do not provide the widest range of available bitrates, frame rates, and resolutions necessary to support the demanding bandwidth constrained environments of deployed SOF. Also lacking with these players are search capabilities compatible with existing SOF infrastructure and VOD servers and components. In addition video and audio editing capabilities are also insufficient for SOF. Security and authentication mechanisms of existing platforms are not robust for demanding SOF applications. The mobile application must support the following key features: HD and SD live and on-demand streams in MPEG-1/2/4 and H.264 formats. Advanced channel guide with grouping and access control, integrated with Microsoft Active Directory. Application shall provide a mosaic viewer for 2, 4, or 9 concurrent videos. Android based player with seamless installation. Advanced VOD Trick-Play services including VOD pause, resume and skip ahead/back. Application shall provide an “emergency broadcast like system” which remotely tunes all clients to operator-specified channel. Application shall provide an intuitive and customizable user interface. Application must provide a CPU meter showing machine resources used by the application. Application shall support closed caption overlays for MPEG-2 and H.264 streams. Application shall support RTSP, HTTP progressive streaming, HTTP live streaming, and HTTPS. Designation: With the ability for the SOF unit to use on demand video for training purposes, lessons learned and knowledge enhancement could be done in the field.

PHASE I: Provide a feasibility study for handheld applications that can provide near real time simple video capabilities display for use in remote SOF operational setting. Included in this study will be an initial concept design and model key elements as well as a detailed outline of success criteria. Phase 1 should also include the processing and submission of all required human subjects use protocols should these be required. Due to the long review times involved, human subject’s research is strongly discouraged during Phase 1.

PHASE II: Design and develop a prototype EZTV Video Display App, based on results from Phase I feasibility. Conduct appropriate engineering testing and system reviews to validate the proposed solution.

PHASE III: This technology will have broad application and be demonstrated in a military setting. The ability to view near real time video feeds form pre determined video channels, accessing tactical videos on demand for training and debriefing or to leverage video for tactical planning for IPTV video encoding solutions need to be highly reliable , quick to deploy and easy to maintain.

KEYWORDS: Mobile Device; Applications; Video, streaming video, real time streaming, IP video, Optibase EZTV

SOCOM12-007 TITLE: Military Specification GPS Capture

TECHNOLOGY AREAS: Information Systems, Sensors, Electronics

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop and demonstrate a cross-platform hand held device application ("App") that can instantly acquire data from any GPS unit and provide field useable GPS data across military specific systems requiring the data.

DESCRIPTION: A GPS is a very important tool for SOF units but getting that data to other device applications is difficult or impossible without manually copying the data to the other devices. A smart phone GPS App Manger can obtain and provide an effective source of data for SOF units to use in their missions by uploading from a connected GPS unit. The GPS information would be transmitted to the Smartphone via a USB connection. The App will be able to store all saved data from the GPS then display in a format that the user can share with other Apps and other users. Another critical ability of the App would be able to download updated "waypoints" or other GPS data to a GPS that is connected Via USB port. The App would have the ability to manually send data to Head Quarters by cell, Wi-Fi, or tethered.

PHASE I: Conduct a feasibility study for handheld applications that can provide simple, easy to use Military Spec. GPS App for use in the operational setting. Ensuring an 'open design' to allow for integration with external GPS devices will be considered a critical performance metric. Included in this study will be an initial concept design and model key elements as well as a detailed outline of success criteria. Phase 1 should also include the processing and submission of all required human subjects use protocols should these be required. Due to the long review times involved, human subject's research is strongly discouraged during Phase 1.

PHASE II: Required Phase II deliverables will include the construction, demonstration and validation of a prototype Military Spec. GPS App, based on results from Phase I. All appropriate engineering testing will be performed, and a critical design review will be performed to finalize the design.

PHASE III: This technology will have broad application and be demonstrated in a military setting. The ability to quickly upload GPS data to a Mobile Phone and than transmitted to other specialty Apps and HQ. Field use for all rapid responders in police and fire fighting fields.

KEYWORDS: Mobile Device, Applications, GPS, Military Specification, Information transfer

SOCOM12-008 TITLE: Omniphobic Treatments for Synthetic Textiles

TECHNOLOGY AREAS: Chemical/Bio Defense, Materials/Processes

The technology within this topic is restricted under the International Traffic in Arms Regulation (ITAR), which controls the export and import of defense-related material and services. Offerors must disclose any proposed use of foreign nationals, their country of origin, and what tasks each would accomplish in the statement of work in accordance with section 3.5.b.(7) of the solicitation.

OBJECTIVE: Develop durable, robust, and scalable, low-surface-energy textile treatments for militarily relevant, synthetic textiles that will prevent absorption and adhesion of fine aerosols and that will shed most bulk liquids.

DESCRIPTION: The currently fielded CB protective overgarment known as the JSLIST, is heavy, can only be laundered six times, has an operational life of only 45 days, has a high thermal burden, and loses its protective capacity when wet with Petroleum Distillates, Oils, or Lubricants (POLs). Unfortunately, all of the uniformed services have critical missions that fall outside of the protective capacity of the JSLIST. These critical missions include fuel handling, aircraft maintenance, firefighting, readiness, etc.

Recently reported research suggests that textile treatments for breathable textiles are emerging that are capable of repelling nearly all liquids as well as adhesion of most solids. These materials are able to repel very low surface tension liquids due to their highly order macro-, micro-, and nano-scale roughness, which allow for a metastable Cassie-Baxter surface that is omniphobic across most military relevant environments. These emerging data suggest that such treated textiles possess a much lower surface energy than typically encountered in non-stick "Teflon" coated cookware (around 15-18 mN/m). This "omniphobic" quality could allow treated materials to shed POLs such as jet fuel and hydraulic fluid, TICs such as acids and caustic liquids, and liquid threat agents such as sulfur mustard and VX. Further, the non-stick quality of these materials would reduce adhesion and allow easy removal of biological and radiological aerosols such as Bacillus anthracis endospores and radioactive dust. Treating the outer shell fabric of a CB protective suit, would considerably reduce the protective burden associated with the adsorbent, and consequently allow for lighter weight lower thermal burden protection.

Most research to date in this area has been focused on relatively easy-to-treat textiles comprised of cotton and cotton:nylon blends. Unfortunately, the US militaries need for fire retardant and ballistic protective garments is driving a move to military garment compositions comprised of harder-to-treat synthetic fibers.

PHASE I: Research the feasibility of developing an aqueous based (<20% organic solvents)or solvent fee textile treatment than can achieve an apparent surface energy of <5 mN/m on 50:50 Nylon:Cotton, nylon, polyester, meta and para aramids, polybenzoxazole comprised fabrics, and a minimum of two commercially available fire retardant fabric compositions. For all fabric compositions: According to AATCC TM 118 and 193 demonstrate repellency ratings of eight for both methods. Show a repellency (contact angle >90º and time to absorption of >20 minutes of 10 µL droplets) to tributyl phosphate, 3-hepten-2-one, methyl salicylate, dimethyl methylphosphonate, dodecane, mineral oil, kerosene, and gasoline. According to ASTM-D737 – 04, demonstrate that the breathability >175 ft3/min/ft2.

PHASE II: Demonstrate that the treated fabrics retain their repellent properties after ten machine launderings using the machine laundering method described in ASTM D 2724. Characterize abrasion resistance of all fabric compositions using ASTM D 4966. The weight of the treated, finished fabric should not exceed 7.5/oz/yd. Demonstrate that the treatment is able to be scaled (commercially acceptable solvents, >10 linear yds/min at 60" width throughput, availability of bulk chemicals, etc.). Deliver 50 linear yards of each treated fabric to TPOC for further testing.

PHASE III DUAL USE-APPLICATIONS: A successful Phase I and Phase II award running concurrent with the planning of the DoD comparative test bed called Uniform Integrated Protective Ensemble Increment Two (UIPE-2) will allow for seamless integration of so-treated materials into this program, into the Air Force's Joint Firefighter Integrated Response Ensemble (JFIRE), as well as others. Fuel handling, firefighting, first responder, protective equipment covers and shelters, lightweight wet, windy weather gear, sporting goods.

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